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IS 7652 (1988): Sphygmomanometer, Aneroid Type [MHD 13: Veterinary Hospital Planning and Surgical Instruments]

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Indian Standard

(Reaffirmed 2006)

SPECIFICATION FOR SPHYGMOMANOMETER, ANEROID TYPE

(*First Revision*)

Anaesthetic, Resuscitation and Allied Equipment Sectional Committee, CPDC 13 [Ref : Doc : CPDC 13 (2102)]

1. Scope — Specifies dimensional and other requirements for aneroid type sphygmomanometer, used for measuring arterial blood pressure of human beings.

2. Nomenclature — For the purpose of this standard, the nomenclature for various parts as indicated in Fig. 1 shall apply.

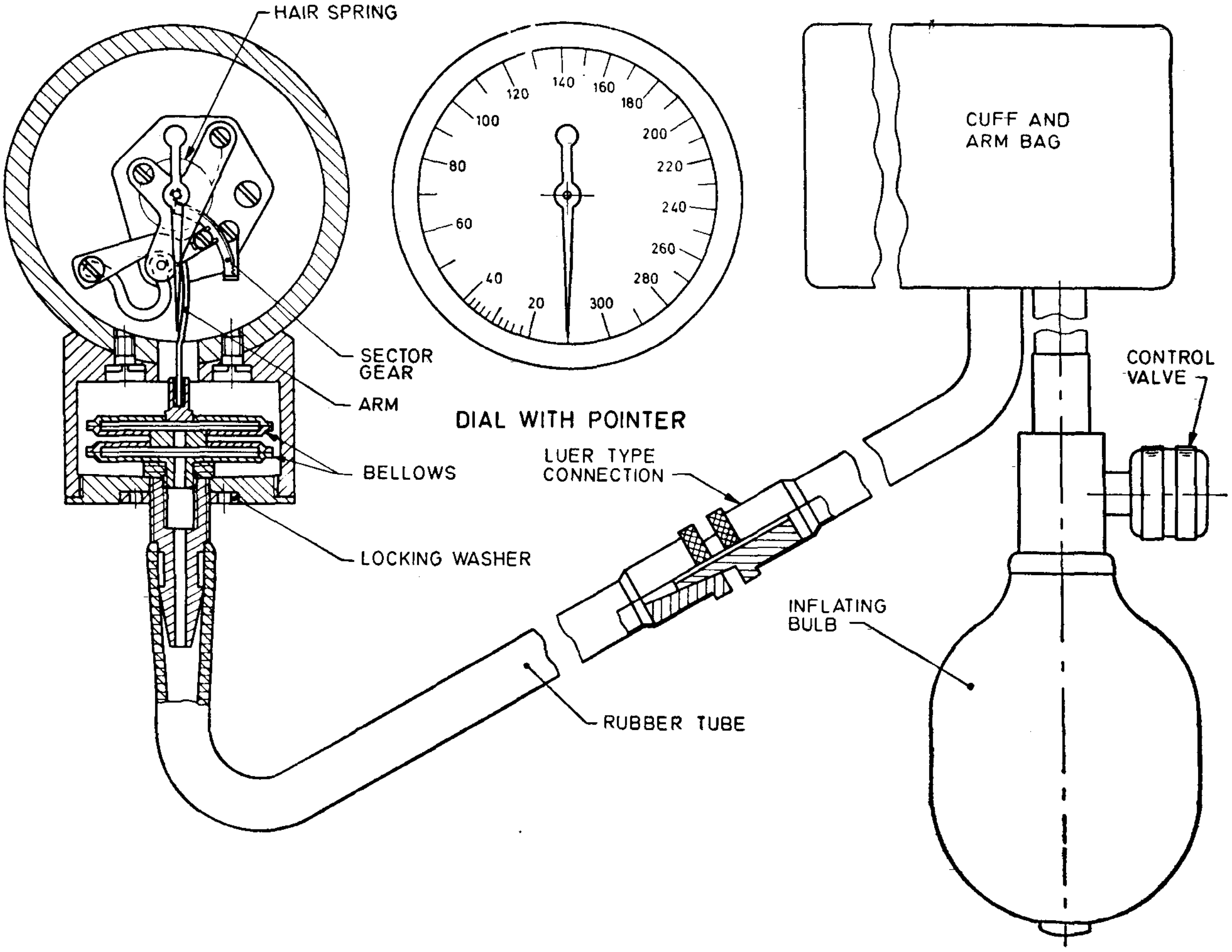

FIG. 1 SPHYGMOMANOMETER, ANEROID TYPE

3. Materials

3.1 *Metal Parts* — shall be made of suitable material for the purpose intended. The metal parts shall be given a suitable corrosion resistant finish where required. They shall satisfy the corrosion resistance test given in **6.5**.

3.2 *Rubber Parts* — shall be made of good quality natural rubber. The inflating bulb, with its inlet valve in position, shall be capable of ageing in an air-oven for 168 hours at 70 ± 1°C without showing appreciable stiffening, softening, cracking or other change in condition. The rubber tubing shall have a minimum tensile strength and elongation at break before ageing as 105 kgf/cm^2 and 400 percent, respectively. A reduction of 20 percent shall be permitted on tensile strength and that of 20 percent on elongation. The tensile strength and elongation shall be tested in accordance with IS : 3400 (Part 1)-1977 'Methods of tests for vulcanized rubbers: Part 1 Tensile stress-strain properties (*first revision*)'.

Adopted 19 May 1988

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3.3 *Glass or Plastic Cover* — The glass cover shall be made of clear glass. The plastics shall be clean, transparent and free from scratches. It shall not crack, peel or otherwise disintegrate in normal use.

3.4 *Fabric* — The fabric shall be of suitable cloth having minimum breaking load specified against Variety No. 1 of IS : 178-1984 'Specification for cotton twill (*second revision*)'.

4. Component Parts

4.1 The sphygmomanometer shall consist of an inflation system, a pressure measuring device (dial type pressure gauge), a housing for the pressure measuring device and its inflation system.

4.1.1 Inflation system shall consist of an adult size cuff and arm bag, inflating-bulb, rubber tubing and a control valve.

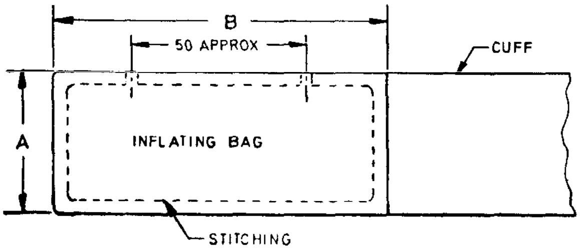
4.2 *Cuff* — The cuff shall be of cotton fabric specified in **3.4**. It shall have two layers of material. A pocket shall be provided for the inflating bag having dimensions as shown in Fig. 2. It shall have an opening of about 50 mm on the side for entry of inflating bag and to accommodate its tubes. The cuff shall be long enough to give proper fastening to the required size of thigh or arm. The deviation on dimensions shall be as given in **4.4.1**.

4.3 *Tubing* — Two lengths of rubber tubes, each approximately 460 mm long shall be attached to one long side of the bag and shall provide air entry from one end and exit from the other. One or both the tubes shall be connected with the extension tubes through leak-proof connections. The internal diameter of the tube shall be 3 ± 1 mm and external diameter shall be $7{\cdot}5\,^{+1}_{-0}$ mm.

4.4 *Inflating Bag* — The bag (*see* Fig. 2) shall be capable of withstanding an internal pressure of 450 mm of mercury without leakage when tested as specified in **6.2**.

The bag shall be of the following sizes:

	Length mm	*Breadth* mm
Thigh, large	500	175
Thigh, small	380	175
Arm, adult	225	125
Arm, child	180	100
Arm, infant	120	60
Arm, new-born baby	80	25



Dimensions	*A*	*B*
Thigh, large	190	550
Thigh, small	190	400
Arm, adult	140	240
Arm, child	115	200
Arm, infant	75	135
Arm, new-born baby	40	95

All dimensions in millimetres.

FIG. 2 CUFF AND INFLATING BAG

4.4.1 Deviations as given below shall be applied on the dimensions given in **4.4** and informal table in Fig. 2:

		mm
Dimensions below 100 mm	Bag	+ 0 − 3
	Cuff pocket	− 0 + 3
Dimensions 100 mm and above	Bag	+ 0 −10
	Cuff pocket	− 0 +10

4.4.2 The dimensions specified in **4.4** are overall dimensions and seams in rubber bag if provided shall be 4·0 ± 1·0 mm wide. Other dimensions may be permitted subject to agreement between the purchaser and the supplier.

4.5 *Inflating Bulb* — The inflating bulb shall be made of natural rubber and may be void in shape. One end shall be securely fitted with an air inlet non-return valve. The other end shall be fitted over the proximal end of the control valve.

4.6 *Control Valve* — Control valve shall be made of metal, with a knurled thumb control device which shall be so attached that it does not become completely unscrewed. Control valve shall be effective in holding a pressure of 300, 150 and 50 mm of mercury with a leakage rate not exceeding 10 mm of mercury per minute. The valve shall be tested at these points and at any intermediate points between 50 and 300 mm of mercury as may be deemed necessary to meet compliance. Control valve shall be capable of giving complete control by hand to give a reduction in pressure at the rate of 1 mm Hg per second to free release.

4.7 *Fastener* — The fastener arrangement of the cuff shall be such that the cuff shall be capable of being held in position. The arrangement may be of bandage type, rib type or any other type, as agreed to between the manufacturer and the purchaser.

4.8 *Scale Range* — 0 to 300 mm.

4.9 *Pressue Measuring Device* — The pressure measuring device shall consist of a dial gauge, capsules or bellows for transmitting air pressure through the link machanism to the pointer. The capsules shall be made of corrugated suitable metal discs, soldered together at the edge. The dial face shall have a pressure scale clearly and permanently marked thereon, the scale extending from 0 to not less than 300 mm of mercury. The graduations shall cover the entire range from 20 to 300 mm in 2 mm divisions. The pointer of the gauge shall be as light as possible and of sufficient firmness at the point to allow accurate reading of the pressure. The gauge shall be of dust-proof construction.

5. Workmanship and Finish

5.1 Workmanship shall be of high grade.

5.2 Sphygmomanometers shall be free from defects which detract from the appearance or which may impair their serviceability.

6. Tests

6.1 *Accuracy of Calibration* — Three calibrations shall be made without tapping and with falling pressures only. The pressure shall be made to fall at a rate of approximately two millimetres per second. The first calibration shall be made only after at least 24 hours have elapsed since the last application of the pressure to the instrument. The gauge shall be in vertical position. Readings shall be taken with decreasing pressure at the highest point of the scale and at all other points which are multiples of 30 millimetres. The pointer of the instrument shall be brought to an even division and the pressure read on the calibrating manometer and instrument under test, are recorded. The second calibration shall be done not less than 6 hours after the completion of the first, in the same manner as the first except that the gauge shall be inclined backwards at an angle of 45° to the vertical.

6.1.1 The tests are made without tapping and with falling pressure since in this manner the conditions of use are most nearly represented. The first calibration is a test of the instrument under the conditions which exist in perhaps the majority of cases where it is used a few times a day with intervals of rest. The second calibration takes into account the fact that the gauge is often inclined considerably when attached to the patient's arm. The error at any point in any of the tests shall not exceed ± 4 mm in the entire pressure of range. After being subjected to pressure and change in position of the gauge, shall not cause the pointer to leave zero limits. The motion of the pointer shall be free from backlash and from irregular motion, when the pressure is changed uniformly. After a sudden jerk, the pointer shall return to the point previously occupied. Excessive irregular motion of the pointer shall be considered a sufficient cause for rejection.

6.2 *Leakage Test (Inflating Bag)* — The bag shall be subjected to an internal air pressure of 450 mm Hg (gauge) for one minute. The bag shall be prevented from ballooning by the use of platens of sufficient strength to withstand the pressure. There shall be no leakage.

6.3 Each completely assembled sphygmomanometer and its valve shall be subjected to internal air pressure of 50, 150 and 300 mm Hg. The leakage shall not exceed 10 mm of mercury per minute when the sphygmomanometer or its valve is cut off from the air supply.

6.4 The sphygmomanometer shall be subjected to an air pressure of 300 mm for 500 times in succession. The accuracy of the instrument shall remain the same when checked in accordance with **6.1**.

6.5 *Corrosion Resistance Test* — The metal parts shall be immersed in a 10 percent solution of citric acid at room temperature for 5 hours. They shall then be boiled in distilled water for 30 minutes and cooled while immersed in it for 48 hours. The metal parts shall show no corrosion. The test shall be conducted in a glass container.

7. Marking — Each instrument shall be legibly and permanently marked with the name or trade-mark of the manufacturer and the manufacturer's serial number.

7.1 *Standard Marking* — Details available with the Bureau of Indian Standards.

8. Packing — The entire instrument shall be supplied in a leather or rexine bag.

9. Instruction Manual — Each sphygmomanometer shall be provided with a manual giving necessary instructions and precautions to be taken for its proper use. The instruction manual shall include technical specification of the sphygmomanometer, list of accessories and spare components to be supplied with the equipment.

EXPLANATORY NOTE

This standard was first published in 1975. The first revision of this standard incorporates the five amendments published so far. The requirement of the rubber parts have also been changed before and after ageing. Reduction of 20 percent in the values after ageing has been specified and the tests are to be done in accordance with IS : 3400 (Part 1)-1977 'Methods of test for vulcanized rubber: Part 1 Tensile stress strain properties (*first revision*)'. The requirement pertaining to glass material as (3.3) is changed to clear glass from flint glass.

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